CLAIMS

1. Video coding method of exploiting the temporal redundancy between successive frames in a video sequence **characterized in that** a reference frame, called I-frame, is first approximated by a collection of basis function, called atoms, and that either the atoms are quantized, entropy coded and sent to a decoder or that the original I-frame is encoded and transmitted to the decoder using any frame codec, and that the following predicted frames called, P-frames, are approximated by the geometric transformations of the basis functions (atoms) describing the previous frame, and that the parameters of the geometric transformation are quantized, entropy coded and sent to a decoder in order to reconstruct the predicted frames.

2. Video coding method according to claim 1, **characterized in that** the I-frame is approximated by a linear combination of N atoms $g_{r_n}(x,y)$:

$$I(x,y) = \sum_{n=0}^{N-1} c_n g_{r_n}(x,y),$$ selected in a redundant, structured library and indexed by a string of parameters γ_n representing the geometric transformations applied to the generating mother function $g(x,y)$ and the c_n are weighting coefficients.

3. Video coding method according to claim 2, **characterized in that** the atoms occurring in the decomposition are chosen using the Matching Pursuit algorithm.

4. Video coding method according to one of the claims 1 to 3, **characterized in that** the parameters and coefficients of the atoms are quantized and entropy coded.

5. Video coding method according the claims 4, **characterized in that** the quantization of the parameters and the coefficients can vary across time, and that the variation is controlled by a rate control unit.

6. Video coding method according to one of the claims 1 to 5, **characterized in that** the method is used together with a residual frame based texture codec that encodes the differences between the original frames and the ones reconstructed using the compensated atoms.

7. Video coding method according to one of the claims 1 to 6, **characterized in that** the geometric features (atoms) of the I-frame are computed from the quantized frames at the encoder and decoder and are not transmitted.

8. Video coding method according to one of the claims 1 to 7, **characterized in that** the geometric features (atoms) are re-computed after each quantized frame at the encoder and decoder and replace the previous prediction.

9. Video coding method according to one of the claims 1 to 8, **characterized in that** the geometric transformations used to build the library are composed of translations, anisotropic dilations and rotations, applied to a generating mother function $g(x,y)$ by means of the following change of variables:

$$g_\gamma(x,y) = \frac{1}{\sqrt{a_1 a_2}} g(x_n, y_n), \text{ where}$$

$$x_n = \frac{\cos\vartheta(x-b_1) - \sin\vartheta(y-b_2)}{a_1}$$

$$y_n = \frac{\sin\vartheta(x-b_1) + \cos\vartheta(y-b_2)}{a_2}$$

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10. Video coding method according to one of the claims 1 to 9, **characterized in that** the generating mother function is of the following form:

$$g(x,y) = (1 - x^2) \exp\left(-\frac{x^2 + y^2}{2} \right).$$

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